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CLAIMS

 A method of measuring a chemical constituent of an opaque slurry comprising opaque slurry particles and said chemical constituent, said method comprising:

flowing at least a portion of said slurry into a separator;
separating said chemical constituent from said opaque slurry particles;
flowing said separated chemical constituent into an optical detector; and
measuring said chemical constituent while said chemical constituent is flowing
through said detector.

- 2. A method as in claim 1 wherein said separating comprises filtering said slurry with a porous filter element.
- A method as in claim 2 wherein said filtering comprises filtering with a filter selected from the group consisting of a filter membrane and a ceramic filter element.
- 4. A method as in claim 3 and further comprising reverse flushing said separated chemical constituent through said porous filter element.
 - 5. A method as in claim 4 wherein said reverse flushing is performed for five seconds or less for each minute of said flowing.
 - A method as in claim 4 wherein said reverse flushing is performed for one second or less for each minute of said flowing.
 - 7. A method as in claim 4 wherein said reverse flushing is performed for one second or less for each five minutes of said flowing.
 - 8. A method as in claim 1 and further comprising flowing said chemical constituent from said optical detector into a reservoir.
 - 9. A method as in claim 8 and further comprising emptying said reservoir.
 - 10. A method as in claim 9 wherein said emptying is performed less than once for each ten minutes of said flowing.
 - 11. A method as in claim 9 wherein said emptying is performed less than once for each twenty minutes of said flowing.
- 30 12. A method as in claim 1 and further comprising recombining said separated chemical constituent and said opaque slurry particles.

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- 13. A method as in claim 12 wherein said recombining comprises reverse flowing said chemical constituent in a reverse direction from the direction of said flowing.
- 14. A method as in claim 12 wherein said recombining comprises flowing said separated slurry particles and chemical constituent into a tank where they are recombined.
- 15. A method as in claim 1 wherein said flowing said separated chemical constituent comprises flowing in a downward direction after said separating.
- 16. A method as in claim 1 where said flowing into an optical detector comprises flowing said chemical constituent in an upward direction through said optical detector.
 - 17. A method as in claim 1 wherein said measuring comprises measuring with a spectrometer.
- 18. A method as in claim 1 wherein said flowing is performed essentially15 continuously.
 - 19. A method as in claim 1 and further including connecting said separator between the dispense engine and the day tank of a slurry distribution system.
 - 20. A method as in claim 1 wherein said flowing, separating, flowing and measuring are accomplished without ever contacting said slurry to a fluid valve.
 - 21. A method of measuring a chemical constituent of an opaque slurry comprising opaque slurry particles and said chemical constituent, said method comprising:

separating at least a portion of said chemical constituent from said opaque slurry particles;

placing said separated chemical constituent into an optical detector; measuring said chemical constituent; and

recombining said separated chemical constituent and said opaque slurry particles.

22. A method of measuring a chemical constituent of an opaque slurry comprising opaque and abrasive slurry particles and said chemical constituent, said method comprising flowing said chemical constituent into an optical detector and

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measuring said chemical constituent without ever contacting a fluid valve with said abrasive slurry particles.

23. A system for measuring a chemical constituent of an opaque slurry comprising opaque slurry particles and said chemical constituent, said method comprising:

a separator for separating said slurry particles from said chemical constituent, and said separator comprising a slurry region and a chemical constituent region;

an optical detector; and

a flow control system for controlling flow of said chemical constituent from said chemical constituent region to said optical detector.

- 24. A system as in claim 23 wherein said separator comprises a filter.
- 25. A system as in claim 24 wherein said separator comprises a cross-flow filter.
- 26. A system as in claim 24 wherein said separator comprises a filter
 selected from the group consisting of a ceramic filter and an inert polymer membrane filter.
 - 27. A system as in claim 26 wherein said filter includes a permeate port located at the top of said filter.
 - 28. A system as in claim 27 wherein said optical detector includes a flow cell and said flow control system includes a chemical constituent conduit connected between said permeate port and the bottom of said flow cell.
 - 29. A system as in claim 23 wherein said flow control system includes a pressure bleed port.
 - 30. A system as in claim 29 wherein said flow control system further includes a valve located between said optical detector and said pressure bleed port.
 - 31. A system as in claim 23 wherein said flow control system includes a pressure source and a first valve.
 - 32. A system as in claim 31 wherein said first valve is located between said pressure source and said optical detector.
- 30 33. A system as in claim 32 and further including a second valve located between said pressure source and said separator.

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- 34. A system as in claim 32 wherein said first valve is located between said pressure source and said separator.
- 35. A system as in claim 23 wherein said flow control system includes a reservoir connected to said optical detector.
- 36. A system as in claim 35 and further including: a chemical constituent return conduit; a first valve connected between said separator and said optical detector; a second valve connected between said optical detector and said reservoir; and a third valve connected between said reservoir and said chemical constituent return conduit.
- 10 37. A system as in claim 36 and further including a fourth valve located between said reservoir and said separator.
 - 38. A system as in claim 35 and further including a liquid level sensor connected to said reservoir.
- 39. A system as in claim 23 wherein said optical detector comprises a15 spectrometer.
 - 40. A system as in claim 23 wherein said flow control system further controls flow of said separated slurry particles from said slurry region, and said control system includes a conduit adapted to connect said separator to a day tank of a slurry distribution system.
- 41. A system for measuring a chemical constituent of an opaque slurry comprising opaque slurry particles and said chemical constituent, said method comprising:
 - a filter including a filter input port, a slurry retentate region, and a chemical constituent permeate region;
- 25 an optical detector; and
 - a flow control system comprising: a conduit connecting said chemical constituent permeate region and said optical detector, and a pressure bleed port connected to said optical detector.
- 42. A system as in claim 41 wherein said optical detector comprises a 30 spectrometer.
 - 43. A system as in claim 42 wherein said filter is selected from the group

consisting of a ceramic filter and an inert polymer membrane filter.